CLAIMS

1. A method of forming a chemical hydride, comprising;

selecting a composition having chemical bonds and which is capable of forming a chemical hydride;

providing a source of hydrogen; and

exposing the selected composition to an amount of ionizing photonic radiation which facilitates the changing of the chemical bonds of the selected composition, and chemically reacting the selected composition with the source of hydrogen to facilitate the formation of a chemical hydride.

2. A method as claimed in claim 1, and further comprising;

after the step of providing a source of hydrogen, and before exposing the selected composition to an amount of ionizing radiation; providing a catalyst which encourages the selected composition to form the chemical hydride.

3. A method as claimed in claim 1, and wherein the selected composition comprises one or more elements selected from the periodic table of elements and which has an atomic number of greater than about 2.

4. A method as claimed in claim 1, and wherein the selected composition comprises one or more elements selected from the periodic table and which forms a resulting chemical hydride having at least about 3 weight percent of hydrogen.

5. A method as claimed in claim 1, and wherein the step of providing a source hydrogen comprises combining the selected composition with a source of water.

6. A method as claimed in claim 1, and wherein the selected composition includes oxygen, and wherein the step of exposing the selected composition to an amount of ionizing radiation changes the chemical bonds of the composition and facilitates the release of the oxygen from the selected composition.

7. A method as claimed in claim 1, and wherein the selected composition forms a resulting chemical hydride which will chemically react, when combined with water, to release hydrogen for use as a fuel.

8. A method as claimed in claim 1, and wherein the selected composition forms a resulting chemical hydride which will chemically react, when combined with water, and in the presence of a catalyst to release hydrogen for use as a fuel.

9. A method as claimed in claim 8, and wherein the selected compound is borate, and ionizing radiation is derived from a nuclear power source.

10. A method as claimed in claim 1, and wherein the chemical hydride is safe to handle and store.

11. A method of forming a borohydride, comprising:

providing a source of borate;

mixing the source of borate with a fluid to form a solution;

exposing the solution of borate and the fluid to an amount of ionizing radiation to facilitate the formation of borohydride; and

precipitating and/or concentrating the borohydride from the solution of fluid and borate previously exposed to the ionizing radiation.

12. A method as claimed in claim 11, and wherein before the step of exposing the solution of borate and the fluid to the ionizing radiation, the method further comprises:

providing a catalyst which encourages the borate to form the borohydride.

13. A method as claimed in claim 11, and wherein after the step of exposing the solution of borate and the fluid to the ionizing radiation, and before the step of precipitating and/or concentrating the borohydride from the solution of the fluid and borate previously exposed to the ionizing radiation, the method further comprises:

applying a voltage to the solution of the borate and the fluid, and wherein the borate when combined with fluid forms individual ions which move apart in the solution of borate and the fluid when the voltage is applied to facilitate the formation of the borohydride.

14. A method as claimed in claim 11, and wherein the amount of ionizing radiation which facilitates the formation of borohydride from the solution of borate and the fluid is greater than about a microcurie per liter of the solution of borate and the fluid.

15. A method as claimed in claim 11, and wherein after the step of mixing the source of borate with the fluid to form a solution, and before the step of exposing the solution of the borate and the fluid to an amount of ionizing radiation, the method further comprises:

increasing the temperature of the solution of the borate and the fluid to greater than about 10 degrees C; and

increasing the pressure to greater than 1 ATM on the solution of borate and fluid to maintain the solution in a liquid phase.

16. A method as claimed in claim 11, and wherein the resulting borohydride has at least about 3 weight percent of hydrogen.

17. A method of forming a borohydride, comprising;

providing a source of recyclable borate which has chemical bonds and which is safe to handle and store;

providing a catalyst which is combined with a source of water;

mixing the source of borate with the catalyst and the source of water to form a resulting solution;

increasing the temperature and pressure of the resulting solution;

exposing the resulting solution to an amount of ionizing radiation which weakens, breaks and/or reorganizes the chemical bonds of the borate to a degree which facilitates, in combination with the catalyst, the production of a borohydride; and

precipitating and/or concentrating the borohydride so formed from the remaining solution.

18. A method as claimed in claim 17, and wherein after the step of precipitating and/or concentrating the borohydride, the method further comprises:

reacting the recovered borohydride in a second chemical reaction which releases hydrogen which is recovered and used as fuel.

19. A method as claimed in claim 17, and wherein the borohydride has at least about 3 weight percent of hydrogen.